CLAIMS

What is claimed is:

1.   A method of scheduling a request for a plurality of Web services comprising the steps of:

(a)   providing a plurality of service activation rules, each service activation rule specifying a trigger condition and a state condition for causing a watcher to invoke a particular Web service;

(b)   receiving at least one event indicating a change in a common memory, wherein each event specifies trigger information;

(c)   comparing the trigger conditions of the service activation rules with the trigger information of the at least one event;

(d)   adding service activation rules that match the at least one event to a trigger list;

(e)   comparing the state conditions of service activation rules in the trigger list with a state of the common memory; and

(f)   selecting the service activation rules of the trigger list that match the state of the common memory, thereby causing the invocation of at least one watcher and corresponding Web service, wherein the state of the common memory is dictated by at least one pattern object.

2.   The method of claim 1, wherein each event indicating a change in the common memory is associated with the pattern object.

3.   The method of claim 1, said step (e) further comprising the step of adding service activation rules of the trigger list that match the pattern object to an executable list, wherein each service activation rule in the executable list is executed in said step (f).

4.   The method of claim 1, further comprising the steps of:

at least one of the watchers modifying the common memory;

the common memory sending at least one event indicating a state change, wherein each event specifies a trigger condition; and

repeating said steps (b)-(f).

5.   The method of claim 4, wherein the at least one of the watchers modifies the common memory according to instructions from an associated one of the Web services.

6.   The method of claim 5, wherein at least one of the watchers modifies the common memory by modifying the pattern object.

7.   The method of claim 1, wherein each pattern object specifies at least two Web services to be performed.

8.   The method of claim 1, wherein at least two watchers each invoke an associated Web service to operate concurrently with one another in said step (f).

9.   The method of claim 1, wherein at least two watchers each invoke an associated Web service to operate sequentially in said step (f).

10.   The method of claim 1, further comprising watchers continuing to invoke Web services until a termination watcher is activated and removes the pattern object from the common memory.

11.   The method of claim 1, further comprising the step of at least one of the watchers modifying the pattern object according to instructions from an associated one of the Web services.

12.   The method of claim 1, wherein said step (f) includes matched service activation rules within an execution list, said method further comprising the steps of:

   identifying service activation rules in the execution list corresponding to competitive Web services;

   comparing the identified service activation rules with at least one service selection rule; and

invoking watchers specified by the identified service activation rules according to said comparing step.

13.   A method of resolving conflicts between competing Web services comprising the steps of:

reading an execution list of service activation rules corresponding to watchers, wherein each watcher is configured to invoke an associated Web service;

identifying service activation rules in the execution list corresponding to competitive Web services;

comparing the identified service activation rules with at least one service selection rule; and

invoking watchers specified by the identified service activation rules according to said comparing step.

14.   A system for processing complex requests for Web services comprising:

a plurality of service activation rules, each service activation rule specifying a trigger condition and a state condition for causing a watcher to invoke a particular Web service;

a server configured to receive a request for more than one Web service;

at least one servlet configured to extract a pattern object from the request and to format a response to the request;

a common memory that temporarily stores the pattern object while the Web services specified by the pattern object execute, wherein said common memory generates events when content of said common memory is changed;

a plurality of watchers, each watcher corresponding to a particular Web service; and

a scheduler configured to receive events, compare trigger conditions specified by said service activation rules with trigger information of events, compare state conditions of said service activation rules in the trigger list with a state of the common memory, and select at least one of said service activation rules causing the invocation of at least one of said watchers and corresponding Web services.

15.   The system of claim 14, further comprising a termination watcher configured to provide the pattern object back to one of said plurality of servlets to generate a response.

16.   The system of claim 14, wherein said watchers are further configured to modify the pattern object according to instructions provided from an associated one of the Web services.

17.   The system of claim 14, further comprising an execution evaluation processor configured to select service activation rules associated with competitive Web services according to service selection rules.

18.   The system of claim 17, wherein said execution evaluation processor invokes at least one of said watchers according to selected service activation rules.

19.   A system for processing complex requests for Web services comprising:

    a plurality of service activation rules, each service activation rule specifying a trigger condition and a state condition for causing a watcher to invoke a particular Web service;

    a common memory that temporarily stores a pattern object while Web services specified by the pattern object execute, wherein said common memory generates events when content of said common memory is changed;

    a trigger evaluation processor configured to compare the trigger conditions of the service activation rules with trigger information from at least one event, wherein said trigger evaluation processor adds service activation rules that match the at least one event to a trigger list;

    a state evaluation processor configured to compare the state conditions of service activation rules in the trigger list with a state of the common memory and cause the service activation rules of the trigger list that match the pattern object to be selected, thereby causing the invocation of at least one watcher and corresponding Web service.

20. The system of claim 19, wherein said state evaluation processor adds the service activation rules of the trigger list that match the at least one pattern object to an execution list prior to execution of each service activation rule.

21. The system of claim 20, further comprising an execution evaluation processor configured to select service activation rules associated with competitive Web services according to service selection rules.

22. The system of claim 21, wherein said execution evaluation processor invokes at least one of said watchers according to selected service activation rules.

23. A system for scheduling a request for a plurality of Web services comprising:

means for storing a plurality of service activation rules, each service activation rule specifying a trigger condition and a state condition for causing a watcher to invoke a particular Web service;

means for receiving at least one event indicating a change in a common memory, wherein each event specifies trigger information;

means for comparing the trigger conditions of the service activation rules with the trigger information of the at least one event;

means for adding service activation rules that match the at least one event to a trigger list;

means for comparing the state conditions of service activation rules in the trigger list with a state of the common memory; and

means for selecting the service activation rules of the trigger list that match the state of the common memory, thereby causing the invocation of at least one watcher and corresponding Web service, wherein the state of the common memory is dictated by at least one pattern object.

24. The system of claim 23, wherein said means for selecting include matched service activation rules within an execution list, said system further comprising:

means for identifying service activation rules in the execution list corresponding to competitive Web services;

means for comparing the identified service activation rules with at least one service selection rule; and

means for invoking watchers specified by the identified service activation rules according to said means for comparing the identified service activation rules with at least one service selection rule.

25.   A system for resolving conflicts between competing Web services comprising:

means for reading an execution list of service activation rules corresponding to watchers, wherein each watcher is configured to invoke an associated Web service;

means for identifying service activation rules in the execution list corresponding to competitive Web services;

means for comparing the identified service activation rules with at least one service selection rule; and

means for invoking watchers specified by the identified service activation rules according to said means for comparing.

26.   A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

(a)   providing a plurality of service activation rules, each service activation rule specifying a trigger condition and a state condition for causing a watcher to invoke a particular Web service;

(b)   receiving at least one event indicating a change in a common memory, wherein each event specifies trigger information;

(c)   comparing the trigger conditions of the service activation rules with the trigger information of the at least one event;

(d)   adding service activation rules that match the at least one event to a trigger list;

(e) comparing the state conditions of service activation rules in the trigger list with a state of the common memory; and

(f) selecting the service activation rules of the trigger list that match the state of the common memory, thereby causing the invocation of at least one watcher and corresponding Web service, wherein the state of the common memory is dictated by at least one pattern object.

27. The machine readable storage of claim 26, wherein each event indicating a change in the common memory is associated with the pattern object.

28. The machine readable storage of claim 26, said step (e) further causing the machine to perform the step of adding service activation rules of the trigger list that match the pattern object to an executable list, wherein each service activation rule in the executable list is executed in said step (f).

29. The machine readable storage of claim 26, further causing the machine to perform the steps of:

at least one of the watchers modifying the common memory;

the common memory sending at least one event indicating a state change, wherein each event specifies a trigger condition; and

repeating said steps (b)-(f).

30. The machine readable storage of claim 29, wherein at least one of the watchers modifies the common memory according to instructions from an associated one of the Web services.

31. The machine readable storage of claim 30, wherein at least one of the watchers modifies the common memory by modifying the pattern object.

32. The machine readable storage of claim 26, wherein each pattern object specifies at least two Web services to be performed.

33.   The machine readable storage of claim 26, wherein at least two of the watchers each invoke an associated Web service to operate concurrently with one another in said step (f).

34.   The machine readable storage of claim 26, wherein at least two of the watchers each invoke an associated Web service to operate sequentially in said step (f).

35.   The machine readable storage of claim 26, further causing watchers to continue to invoke Web services until a termination watcher is activated and removes the pattern object from the common memory.

36.   The machine readable storage of claim 26, further causing the machine to perform the step of at least one of the watchers modifying the pattern object according to instructions from an associated one of the Web services.

37.   The machine readable storage of claim 26, wherein said step (f) includes matched service activation rules within an execution list, said machine readable storage further causing the machine to perform the steps of:

        identifying service activation rules in the execution list corresponding to competitive Web services;

        comparing the identified service activation rules with at least one service selection rule; and

        invoking watchers specified by the identified service activation rules according to said comparing step.

38.   A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

        reading an execution list of service activation rules corresponding to watchers, wherein each watcher is configured to invoke an associated Web service;

identifying service activation rules in the execution list corresponding to competitive Web services;

comparing the identified service activation rules with at least one service selection rule; and

invoking watchers specified by the identified service activation rules according to said comparing step.